



R6 Office of Planning & Coordination NEPA Compliance Team

**Geographic
Information
System
Screening
Tool**

GISST



**A GIS-Driven Environmental
Assessment & Data management
Tool for Environmental Streamlining**



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Purpose of this Presentation

Overview of R6 Approach as related to the following:

Environmental problem

Ecosystem protection relationship

Management decisions

Measured results/lessons learned

EPA Goals

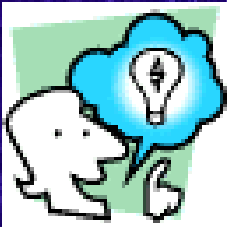
Take home message





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GISST & NEPA



The Ultimate Objective is

- Strengthen Env. Assessment Process
- Protection of Human and Ecological Resources



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ATTRIBUTES OF GISST

Uses a watershed approach to evaluate
“risks”

Uses “criteria” to evaluate impacts
(1-5 scale)

Over 100 different criteria (peer
reviewed)





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HOW DOES IT WORK?



Area

defines the site as a % of the watershed

Vulnerability



characterizes env. features in the WS

Impact

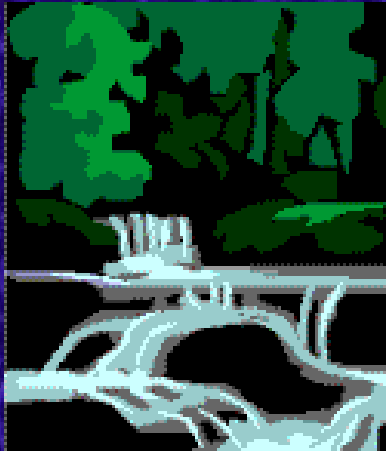


characterizes specific site activities



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CRITERIA



Vulnerability Criteria

Environmental

Socio-economic

Impact Criteria

Compliance Data

Facility Operations





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EXAMPLE CRITERION

Wildlife Habitat

<u>% Acres affected</u>	<u>Score</u>
< 10 %	1
10% ≤ % acres affected < 20%	2
20% ≤ % acres affected < 30%	3
30% ≤ % acres affected < 40%	4
≥ 40%	5



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Why ask why?

Improved quality of review

earlier comments are focused & issue specific (vs generic)

Early actions driven by technological capabilities

not just by what we're being "told" is occurring

Wholesale approach

serves more customers

Region-wide capacity

consistent high-quality environmental assessments

Institutional knowledge-base

"captured" and enhances through technology



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Example 1: CAFOs



Problem: very large swine feedlots

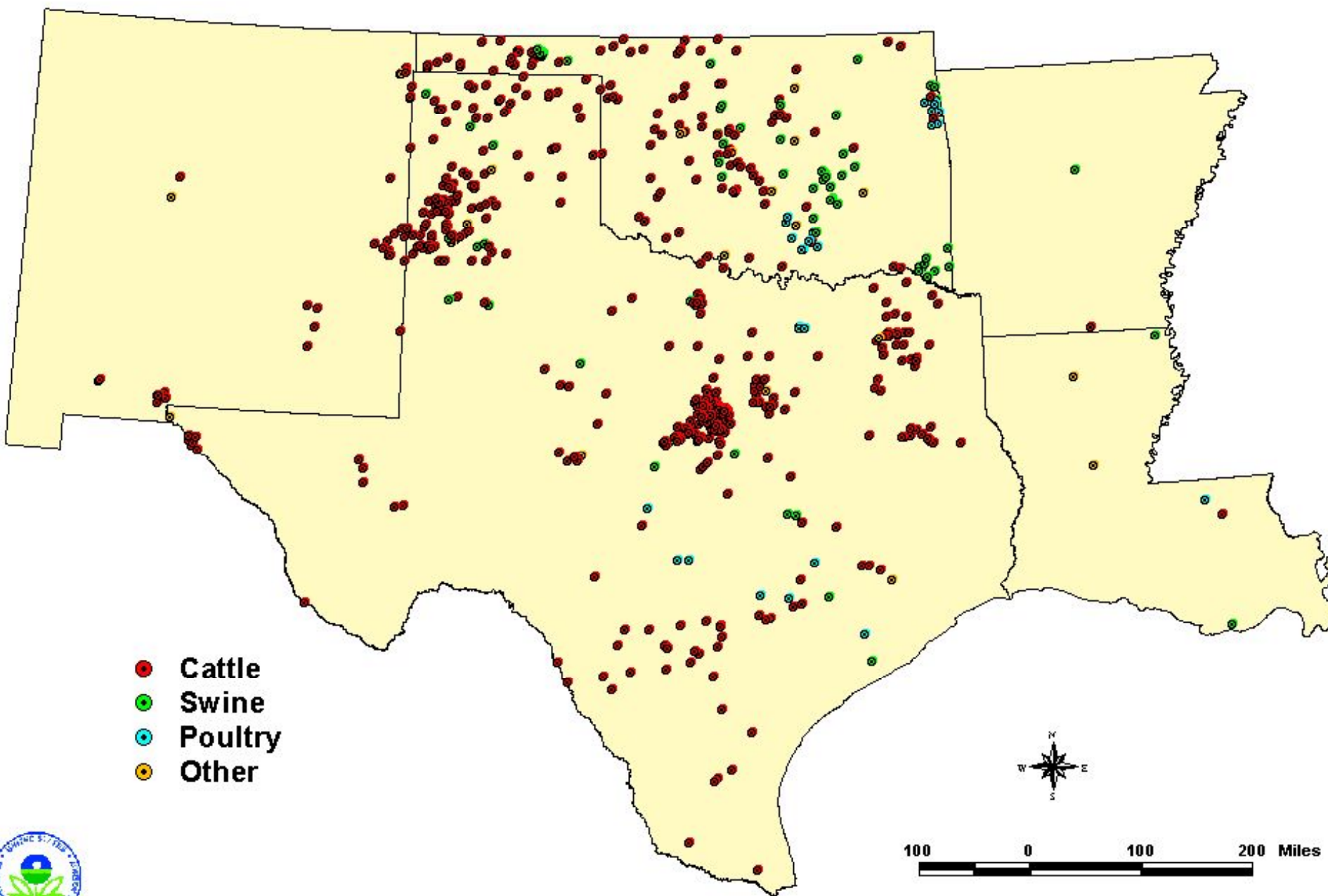


Protection: nitrate contamination, odor, etc.

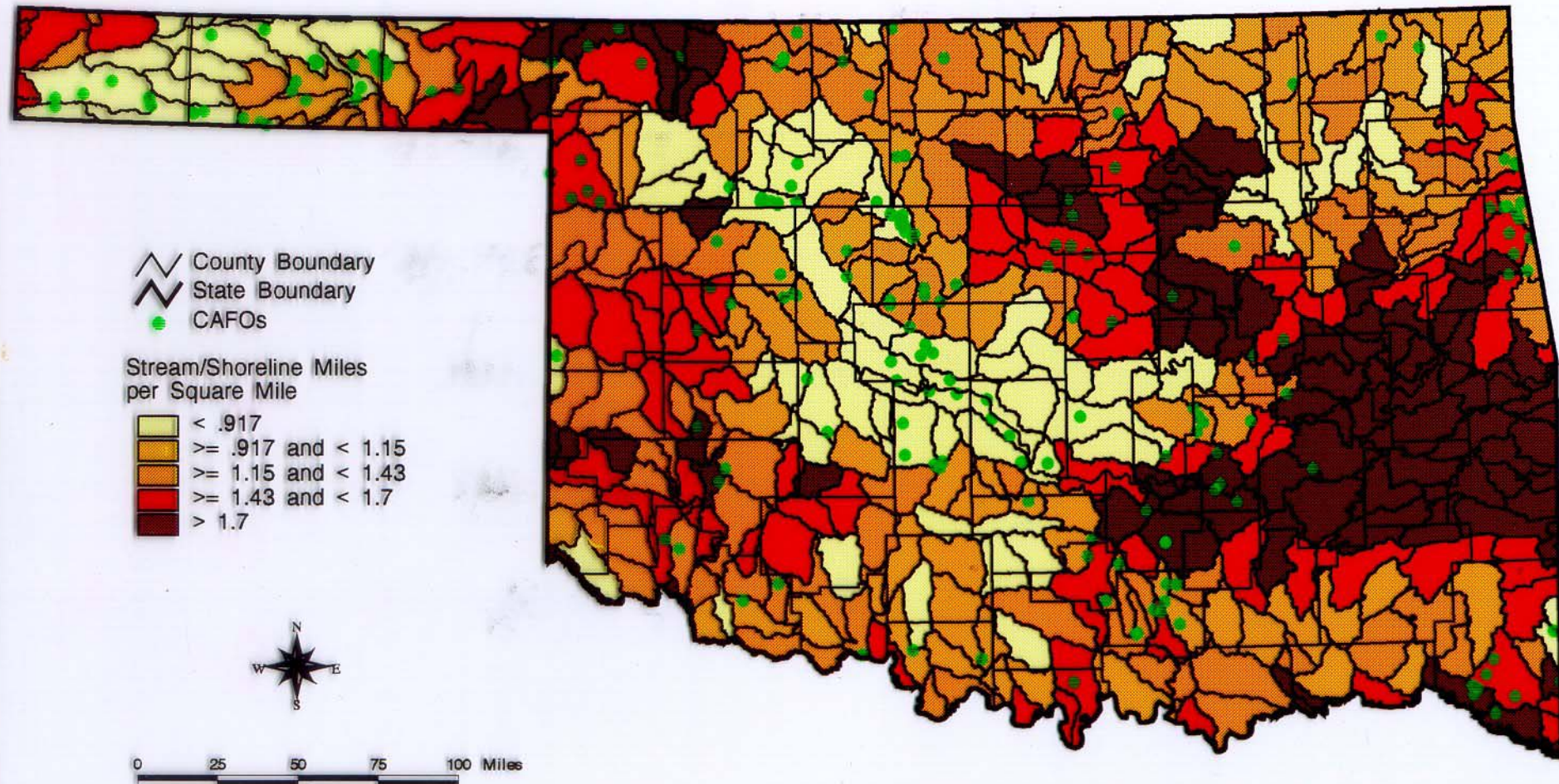


Mgmt: Monitoring activities in the FNSI

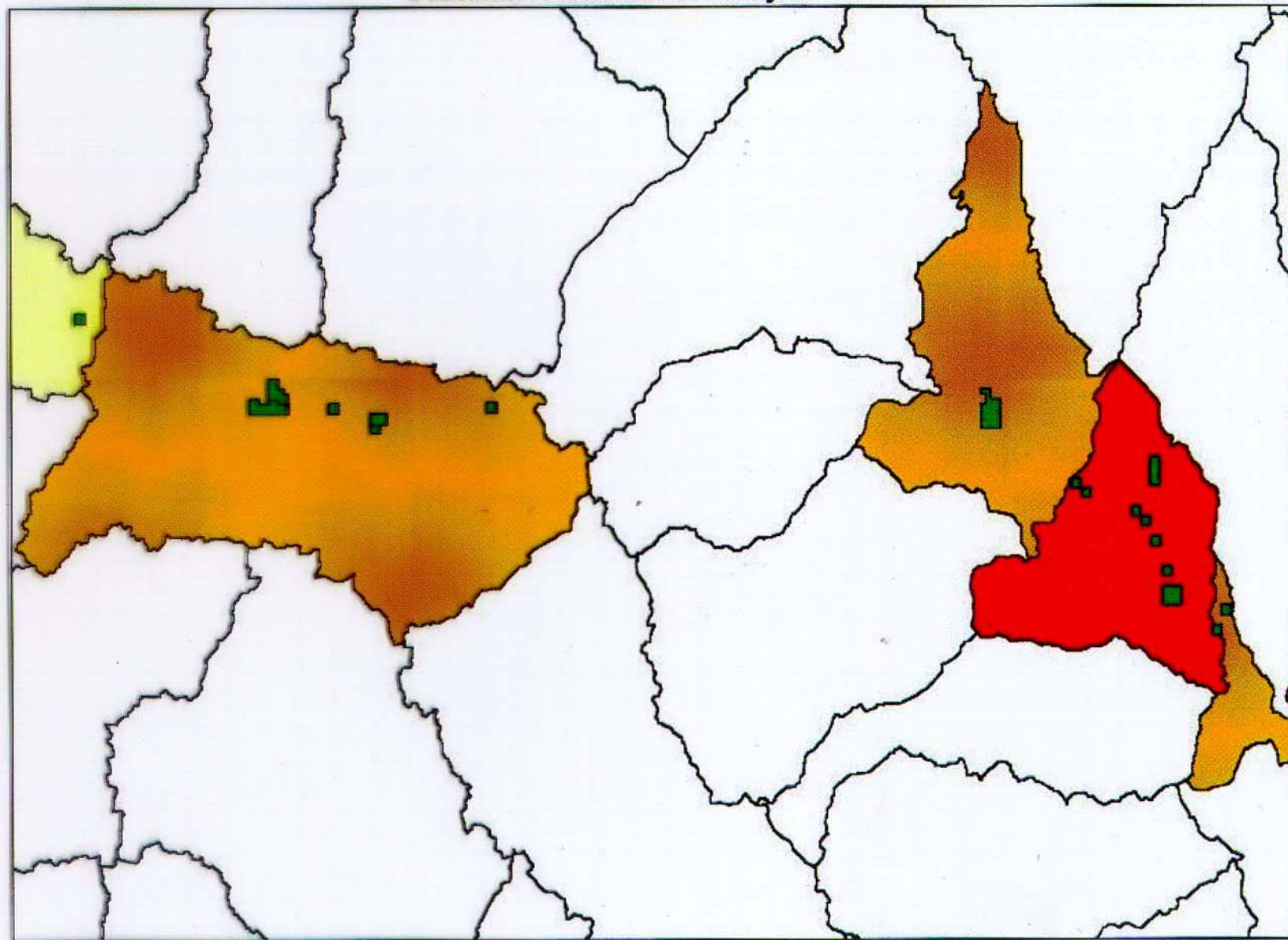
Region 6 CAFOs



Confined Animal Feeding Operations Surface Water Quantity



Confined Animal Feeding Operations Cumulative Risk Index Analysis



CRIA Values



0 5 10 Miles



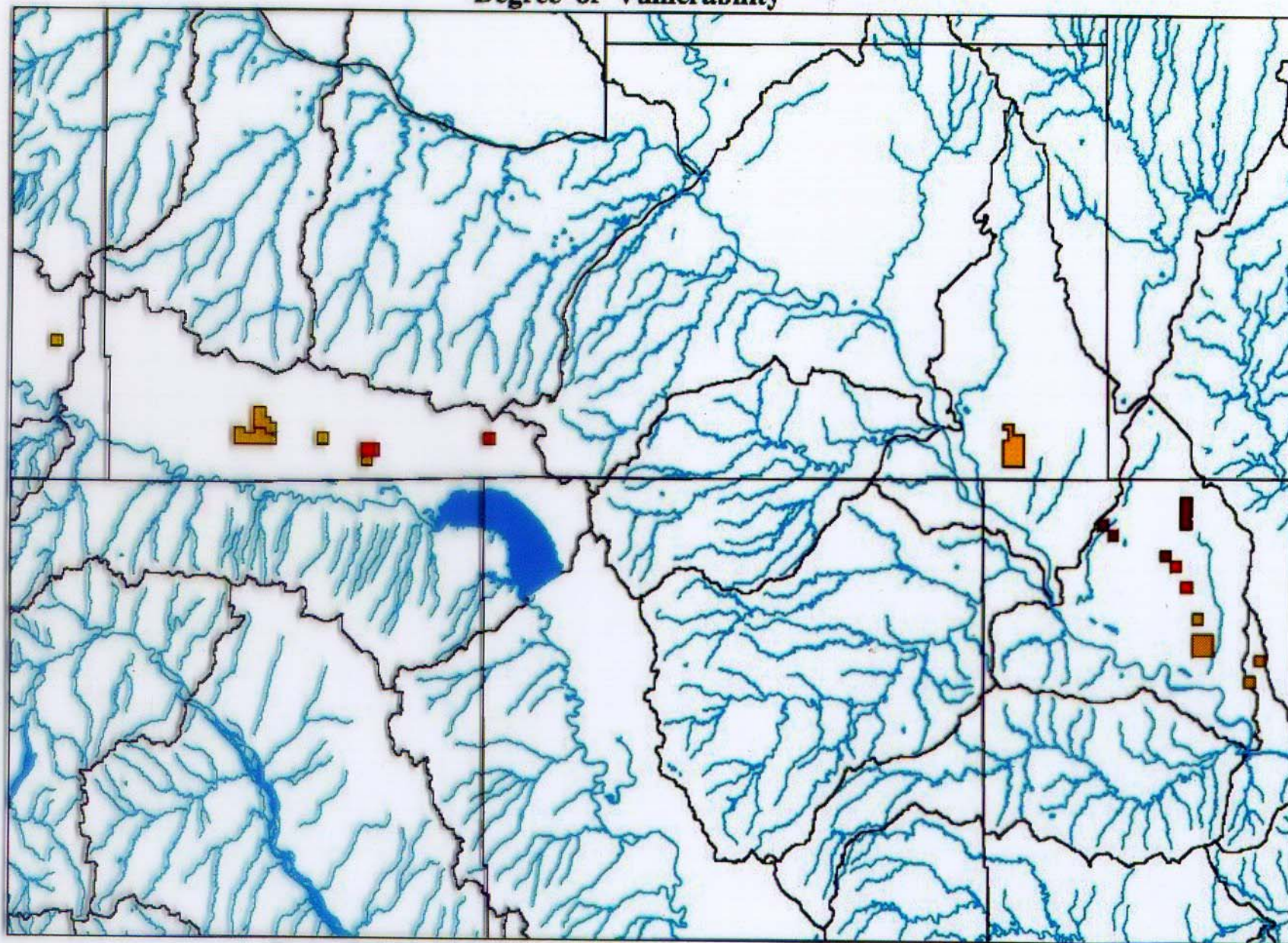
Map Created: 1/28/97

Sources:
U.S. EPA - Region 6
Agri-Waste Technology, Inc.



EPA Region 6
GIS Support Team
Dallas, TX

Confined Animal Feeding Operations Degree of Vulnerability



Degree of Vulnerability Scores



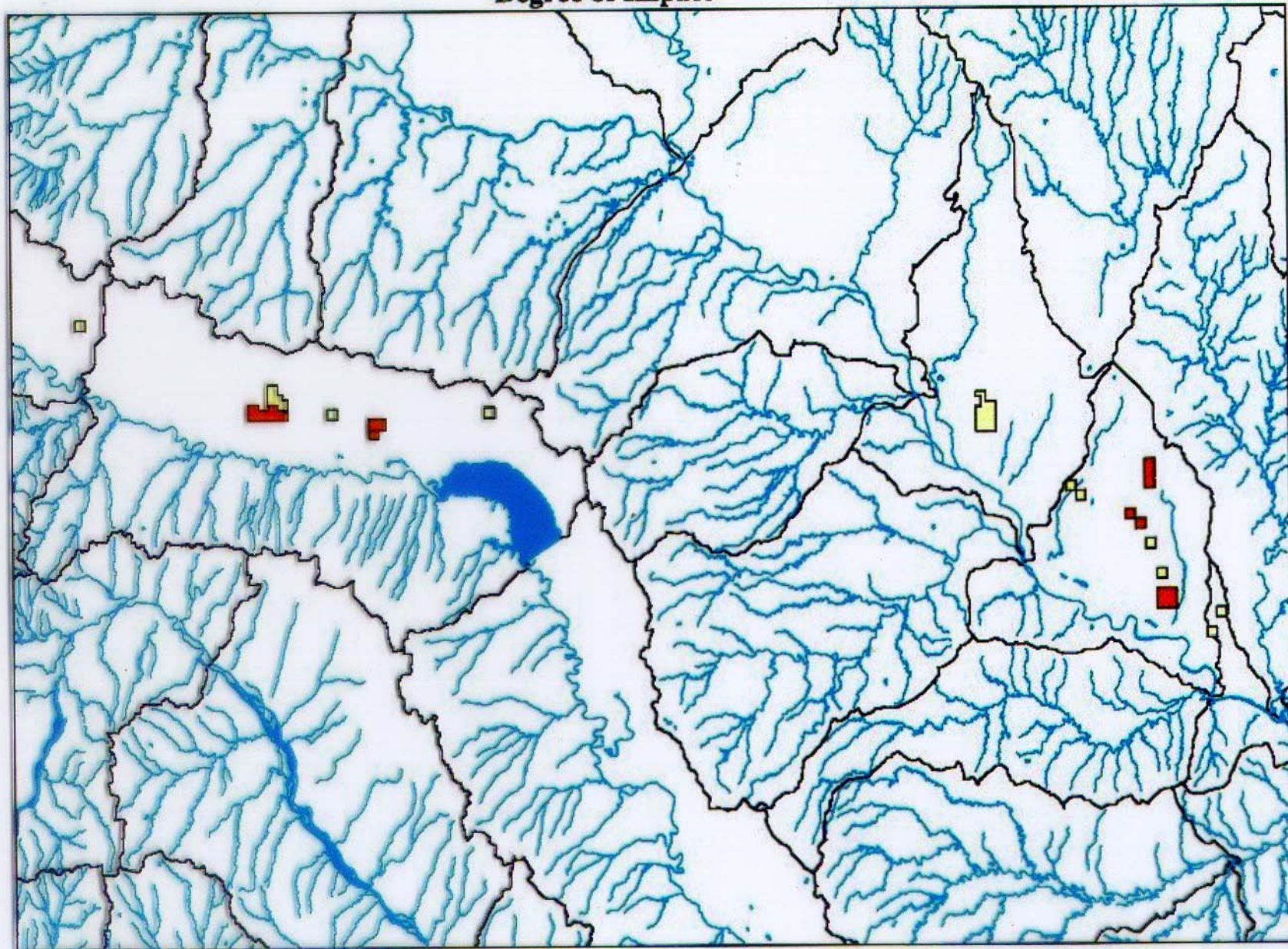
0 5 10 Miles



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Dallas, TX

Map Created: 1/23/05

Confined Animal Feeding Operations Degree of Impact



Degree of Impact



0 5 10 Miles



Map Created: 1/28/97

Sources:
U.S. EPA - Region 6
Agri-Waste Technology, Inc.



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Example 1: CAFOs



**Results: Elevated nitrates found,
Enforcement Action taken**



Goals: 4, 8, and 9



**LL: too late to have included other
facilities**



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EXAMPLE 2: Houston Toad

POTENTIAL HABITAT INDEX

- **Habitat/Land Cover (GAP Data)**
- **Current Species Locations – If Available**
- **Habitat from FWS**





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EXAMPLE: Houston Toad POTENTIAL HABITAT INDEX

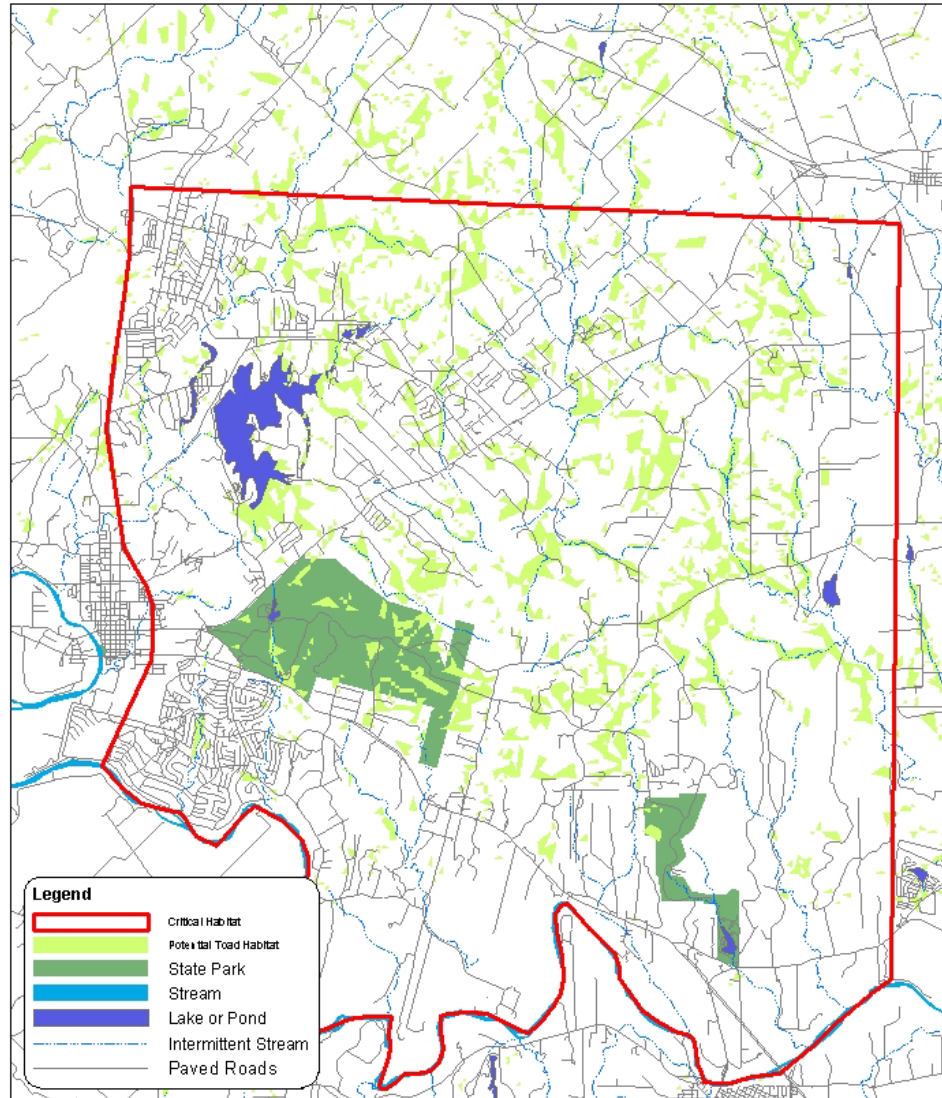
Problem: significant cumulative effects

Protection: ESA issues, habitat degradation

Mgmt: better EAs (thus decisions),
communication w/ FWS



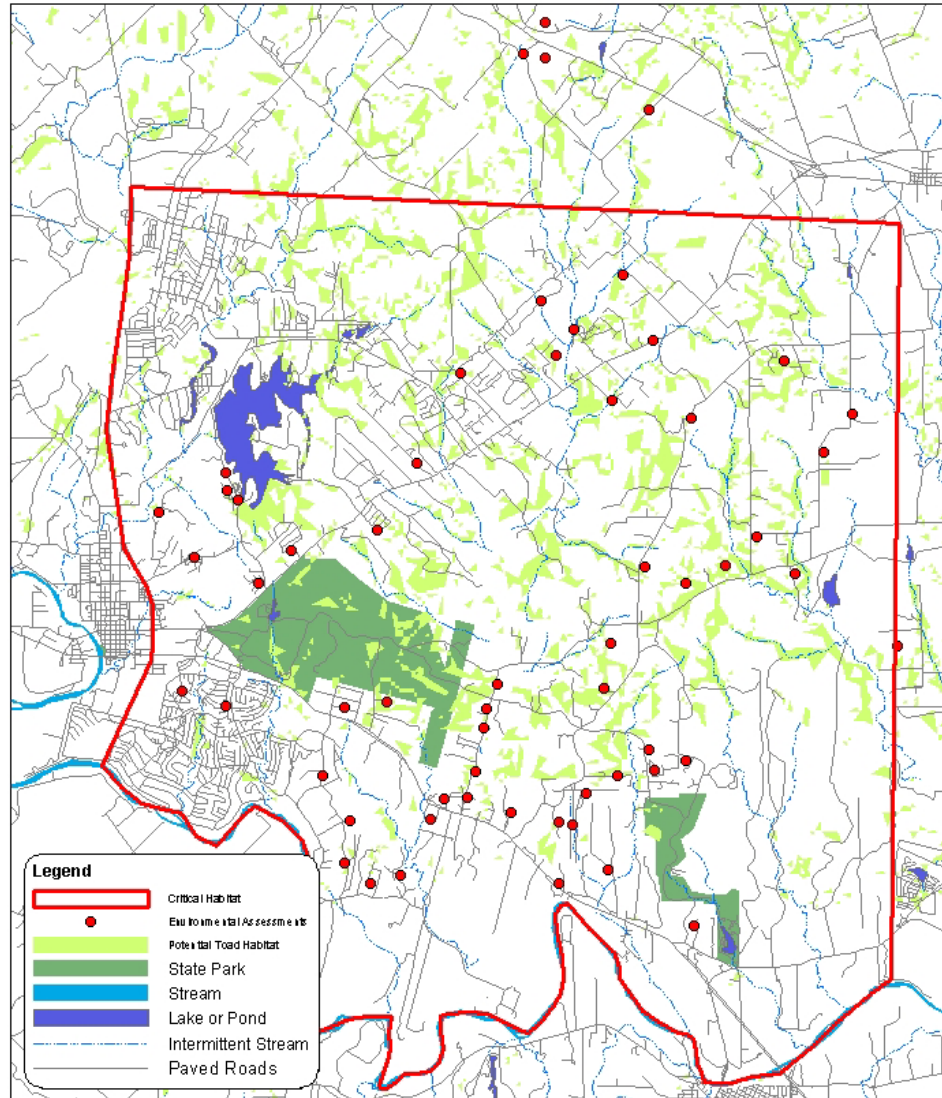
Houston Toad Potential Habitat Bastrop County



Potential Toad Habitat-
Woodland or open land near woodland
Suitable soils - Patillo-Demonia-Silstid & Axtell-Tabor Associations

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Dallas, Texas
20100924SL02

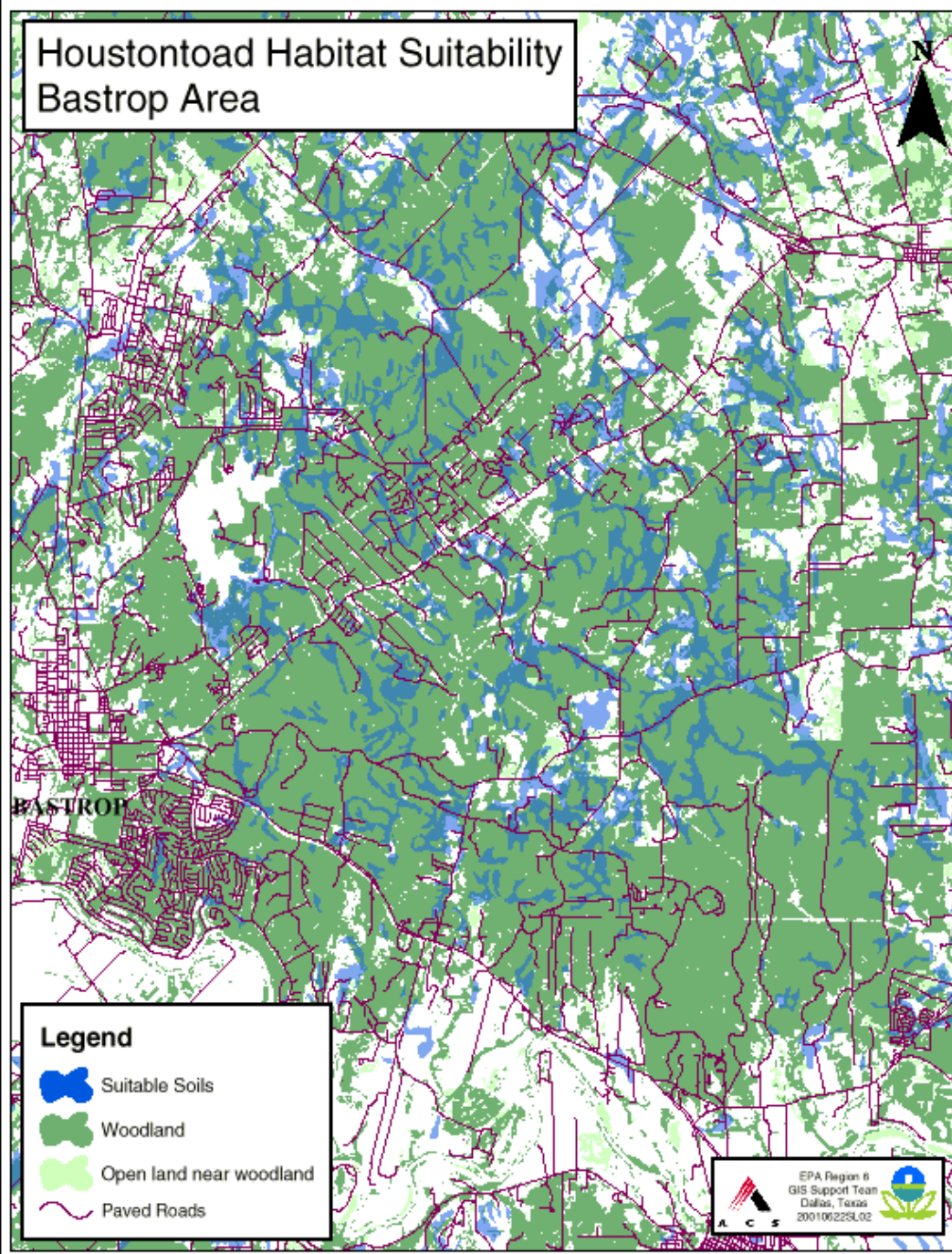
Houston Toad Potential Habitat and EAs Bastrop County



Potential Toad Habitat-
Woodland or open land near woodland
Suitable soils - Patillo-Demonia-Silstd & Axtell-Tabor Associations

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GIS Support Team
Dallas, Texas
20100924SL01

Houston toad Habitat Suitability Bastrop Area





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EXAMPLE: Houston Toad POTENTIAL HABITAT INDEX

Results: focus on County HCP, greater attn to cumulative impacts & science

Goals: 8 and 9



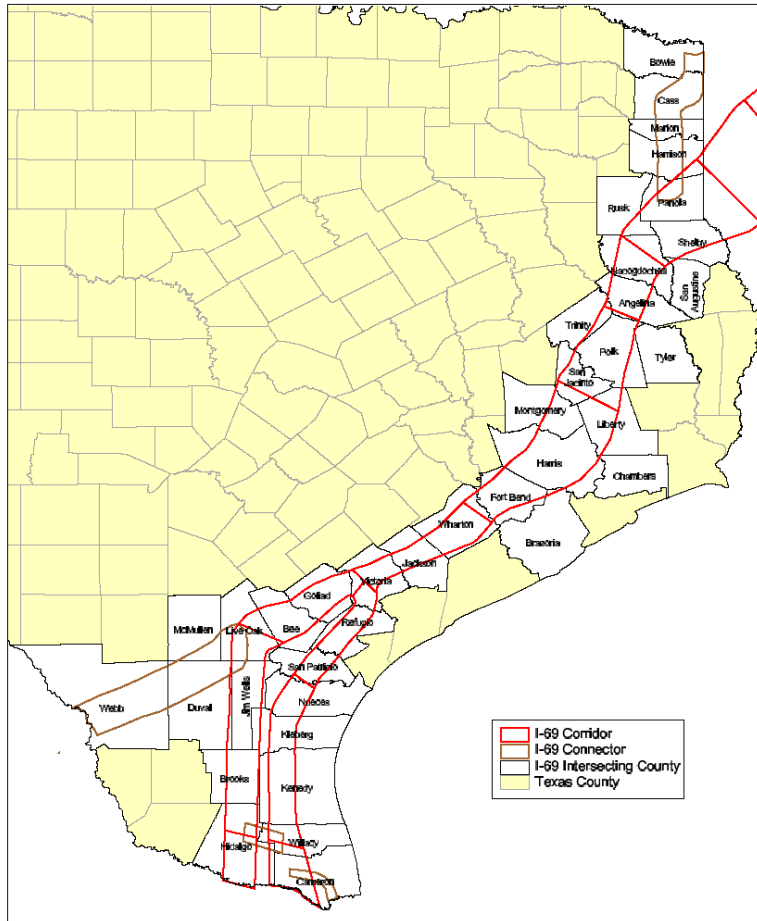
LL: interact w/ County earlier, higher levels of communication w/FWS



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EXAMPLE 3: I-69

I-69 Corridor
Texas Counties



Problem: very large project, multiple states, etc.

Protection: ID & avoid priority ecological areas

Mgmt: “buy-in” from other agencies, \$ for GIS products



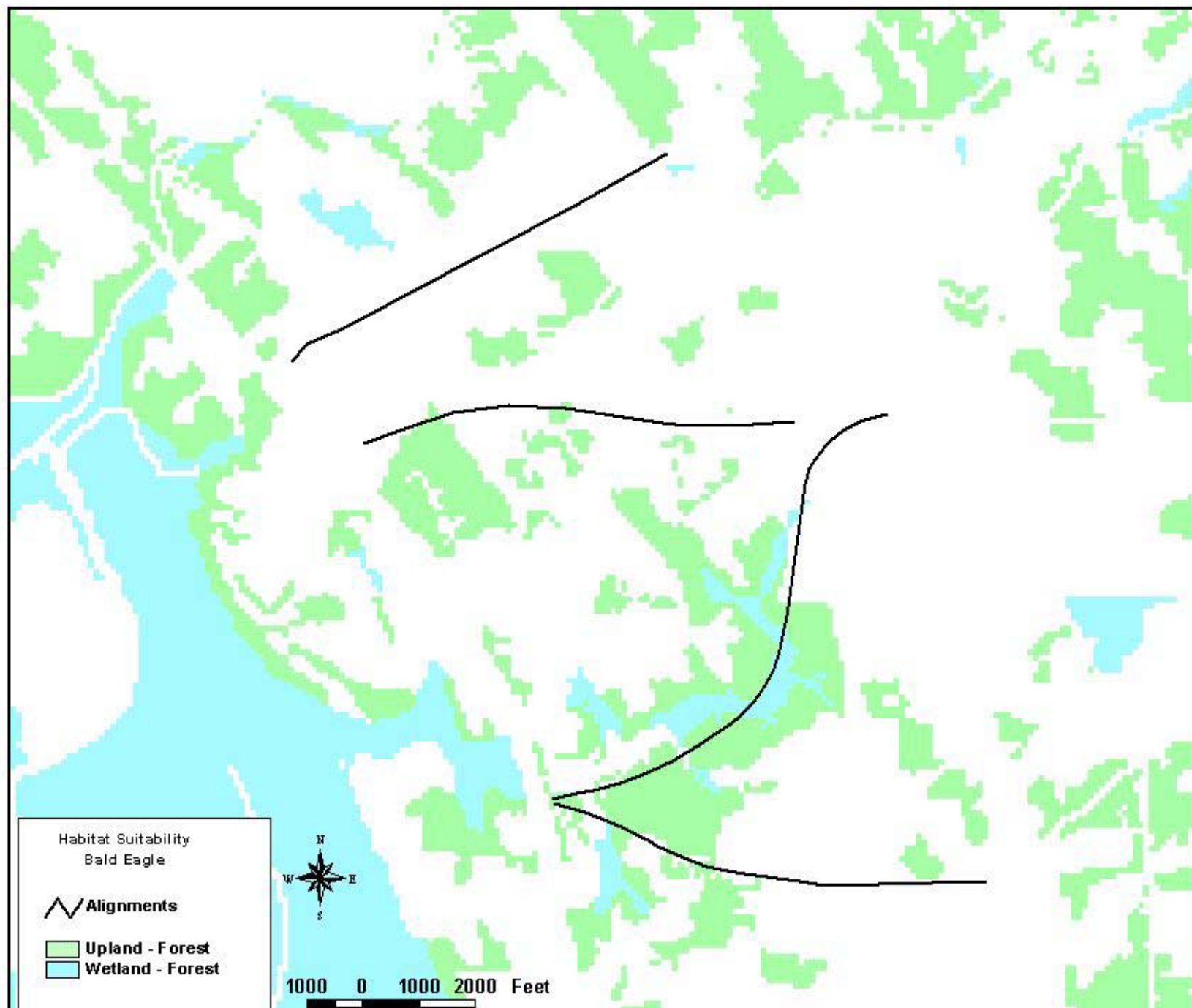
0 50 100 150 Miles



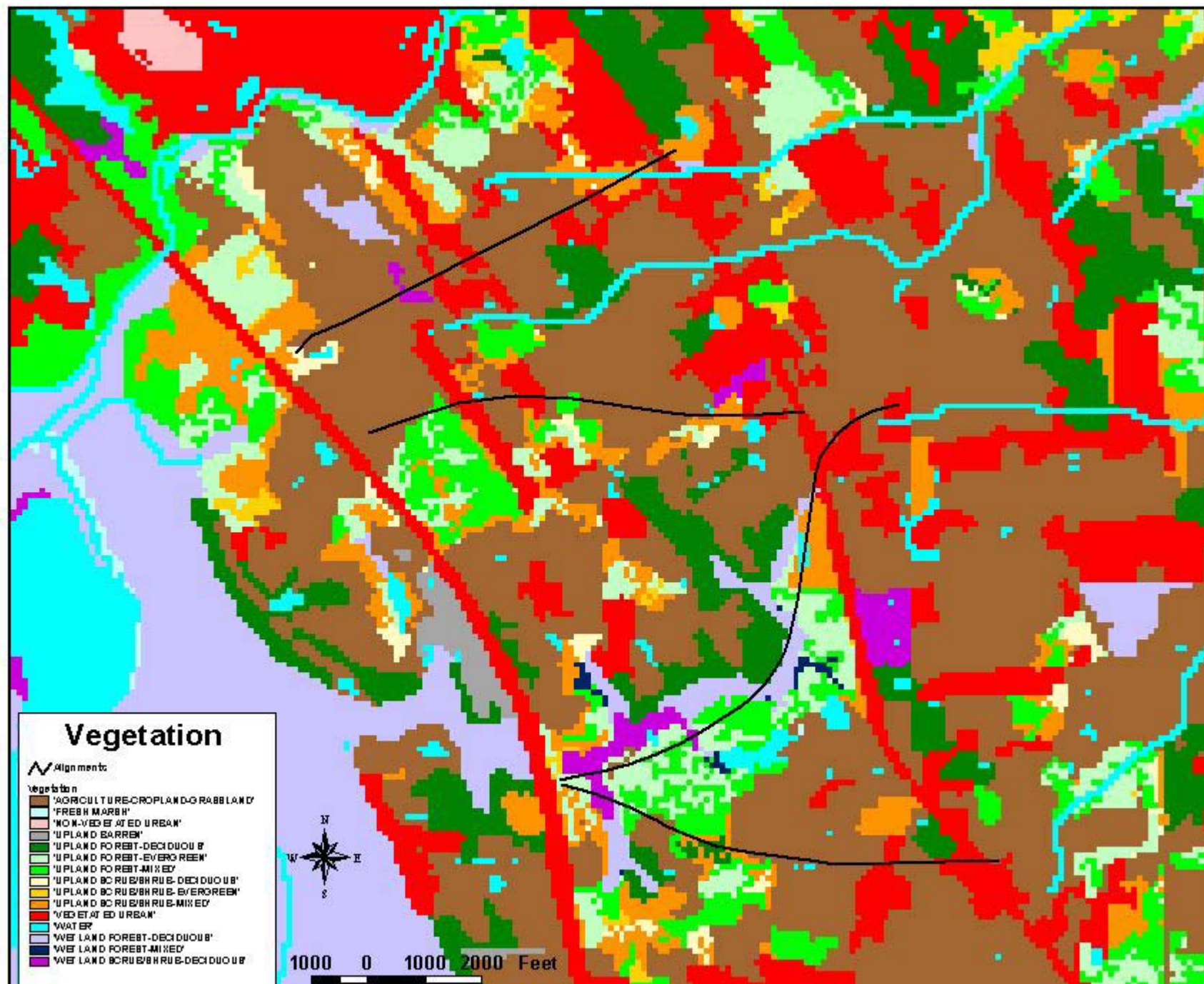
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HIGHWAY SCORES

Option	1	2	3	4
Area of Const. Zone in WS	223	127	216	224
% of CZ in WS	0.17	0.10	0.17	0.17
GISST Score	1	1	1	1
% Wildlife habitat (0.5 mile)	63	73	69	73
GISST Score	5	5	5	5
Surface Water Quantity	0.57	0.35	1.15	0.56
GISST Score	1	1	3	1
Soil Permeability Score	2.94	1.55	2.99	2.31
Ground Water Depth Score	1.09	2.67	1.04	2.12





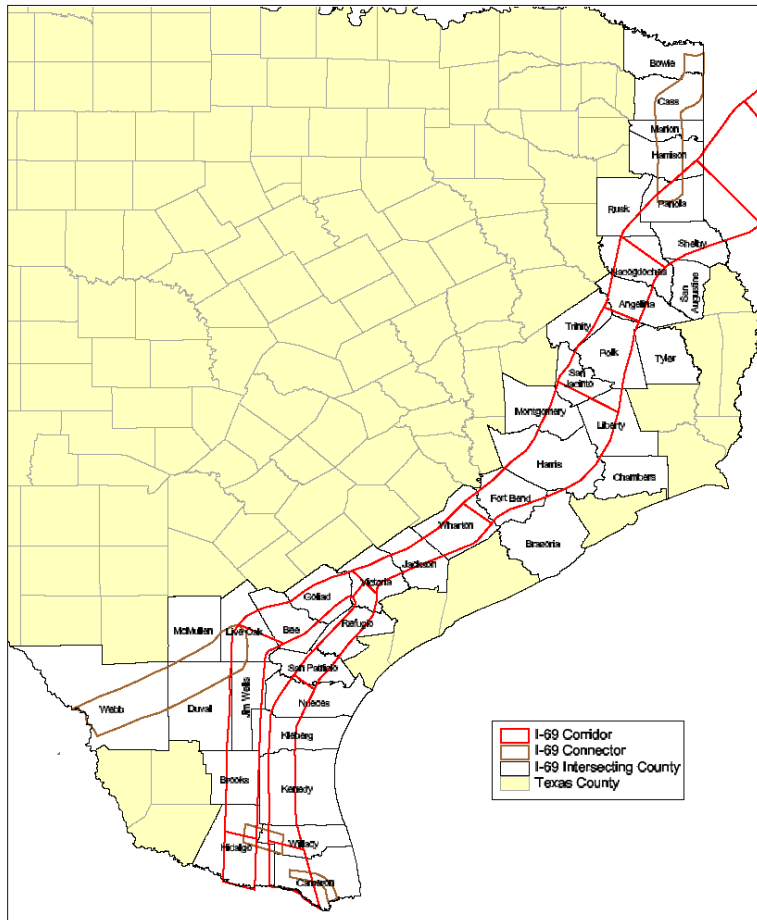




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EXAMPLE 3: I-69

I-69 Corridor
Texas Counties



Results: better alternatives in NEPA, early ID of problems

Goals: 7, 8, 9

LL: still “in-process,”
adaptive mgmt



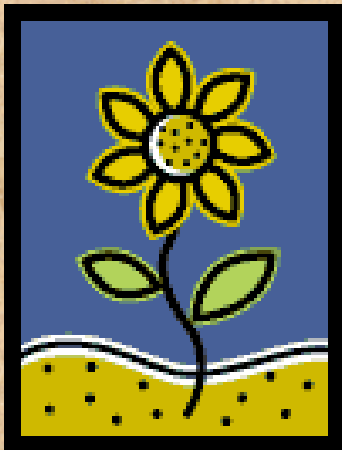


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Analysis Questions

Where are the remaining natural areas?

Where are the best restoration sites?



Reforestation

Wetland Restoration

Habitat Connectivity



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Types of Metrics

Area

Edge

Shape

Core Area

Diversity

**Patch density, size,
and variability**

Nearest neighbor

**Contagion and
Interspersion**





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Landscape Programs

*FRAGSTATS: McGarigal
and Marks 1995*

*APACK: Mladenoff &
DeZonia 2001*

GRASS/r.le: UNIX

Patch Analyst

<http://www.fsl.orst.edu/Iter/data/tools/software/>



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GISST: Take home message 1

Screening level

not meant to replace field investigations

Developed in-house

users know how it works vs purchased software

Flexible

new criteria can be added/changed as needed

Scaling

locally- to regionally-scaled projects



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GISST: Take home message 2

Clarity

Consistency

Transparency



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GIS